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ALLEGHENY PORTAGE.

Report of Moncure Robinson, principal Engineer upon the Allegheny portage.

To the Board of Canal Commissioners of the State of Pennsylvania.

GENTLEMEN,

By the resolutions of the Board of the 8th of Decr. last, appointing me the engineer of the Allegheny portage, my attention was directed to three points, "1st, the construction of a rail-way overcoming the summit by means of stationary engines, or self-acting planes, with intermediate levels, or moderately ascending planes. 2d, the construction of a Macadamized turnpike of the best kind, between the same points. 3d, the suggestion of any other plan which might occur to me as calculated to afford the best accommodation to trade."

It was further resolved,

"That Mr. Robinson be directed as soon as he shall have made the necessary examinations, to furnish the board with his views and opinions in detail."

Agreeably to this resolution, I have now the honor to submit to the board the following report:

Two considerations of less moment in the location of a canal, become objects of indispensable attention in that of a rail-road, and in determining its profile, viz: the amount and the direction of the trade to be anticipated on it; a knowledge of each fact, as far as it can be ascertained, is essential to a decision between rival routes, where it becomes often a question how far a more eligible trace may be justified at an enhanced cost. The proportion of trade, or its relative distribution in each direction, has its influence where no such question is to be settled, because on this *ratio* depends the graduation which may be advisable for each portion of the roadway, and which of course, is to be approached as nearly as it can be attained, without incurring an expense more than commensurate with the object.

In a report of the 4th of December last, on a proposed rail-way connexion between the Susquehanna and Schuylkill, I took occasion to consider this subject in some detail. The conclusion was deduced that between the Susquehanna and the dividing ground, that is to say, *in the direction of greatest transportation*, the ascending graduation per mile should be reduced to its minimum, the remaining ascent being overcome by inclined planes and stationary power at points of convenient location.—The reasoning which led to this conclusion, applies with greater force to the Allegheny portage. There can be no doubt that the trade must be immense on a line of rail-way, intended to connect the east and west, and two divisions of canal, each of which passes through a district peculiarly fertile in most valuable but ponderous minerals, and almost as little that whatever may be the present ratio of that trade, that from the west to the east must after a time preponderate.

No views which would be new in confirmation of the opinions here expressed, can be offered to the consideration of the board. Under this impression, they are submitted without comment.

The same views, however, which recommend a cheaper power than that of horses on a railway which is to traverse the Allegheny, and the largest facilities which can be afforded on the graduated portions of it, urge quite as strongly the greatest practical diminution of the amount of absolute power required; or, in other words, that the mountain should be crossed at the least elevation, and by a line of the least length which may be attainable. If, as is believed, the rail-way will in a few years have nearly as large an amount of trade as it can accommodate, all elevation beyond what is necessarily encountered, any unnecessary increase of distance and obstacles arising from unnecessary curvatures, will form a perpetual tax on this trade, which ought as far as possible, to be avoided.

Preliminary to the trace of any route, a full examination was made of the summit, as far north and south as there was the least probability that a line would cross. It resulted in ascertaining the fact, that the Sugar run summit, to which attention had been first drawn by Mr. Blair, and across which one of the lines of Mr. Roberts had been traced, was the most reduced point within the range of the contemplated connexion at which the mountain could be crossed. It next became an object of inquiry how far a diminished elevation might be attained by tunneling.

Bends of level were traced on each side of the mountain, (where the information sought for was not afforded by previous surveys,) so as to show by the proximity of these lines when plotted, the points which presented themselves under the most favourable aspect, and examinations were afterwards made on the ground at these points. It was ascertained that south of the northern turnpike, a more reduced elevation than that of the Sugar run summit, could not be effected without incurring the expense of a tunnel of unreasonable length, and more than proportional expense; that north of the Blair's gap turnpike, two points presented themselves affording more than ordinary facilities; that at one of them, a short distance north of Samuel Lemon's tavern, a summit level one hundred feet lower than the Sugar run summit might be effected by a tunnel of a mile, that at a second point one and a half miles further north, the summit level might be reduced 200 feet by a tunnel of a mile and one sixth: the greatest height of the comb of earth, in the former case being 177 feet, in the latter 240 feet.

Setting aside the point of elevation, it was further apparent on a mere view of the country, that the greatest facilities for the location of a valuable line of rail-way, would not be presented south of the turnpike, and it appeared from the surveys of the preceding season that any practicable line in this quarter could not be materially, if at all, shorter than one passing along the western slope of the Allegheny mountain, crossing at the point first named, and descending by the Blair's gap valley. Under these circumstances it was evident, that further examinations might, without hazard, be confined to such lines as would cross the summit, either at the Sugar run gap, or at one or other of the points above named, as far as favorable to a reduction of the summit level.

The line first traced was that crossing immediately north of Samuel Lemmon's tavern, this appearing on a reconnoissance of the ground, to combine more completely than any other the recommendations of reduced elevation, diminished distance and relative facility. A topographical plan and profile of this line revised at each point, which admitted of any material improvement, is

herewith presented. It will be unnecessary to trouble the board with a detail of the extended and minute examinations which have led to the conclusion that it presents in an eminent degree the most eligible route for a rail-road, or the plan contemplated by lifts and levels. It may be proper however to remark, that the line which crossed at the more reduced summit was with much reluctance abandoned, and only after it was discovered that it would prove much more expensive; on the western side of the summit much more circuitous, and that insuperable difficulties would attend the location of lifts along the Sugar run valley.

The line adopted may for convenient consideration be classed in two divisions, commencing at a BM on a beech, on a branch of Clearfield north 45° 30′ west, of Lemmon's 2,004 feet above our summit level, and going east, it curves on a radius of 500 feet to the western entrance of the tunnel at station 5. After piercing the mountain it is located on the steep slopes S. of the N. branch of the Blair's gap run, falling at five points, by inclined planes and in the intervening distances, at a graduation varying between 3–100 ths and 32–1000 ths of a foot per ten feet. The foot of the last inclined plane is located about six miles from the eastern entrance of the tunnel, and about one third of a mile below the Blair,s gap inn. From this point the hills fall away on each side of the Blair's gap valley, and become too much indented with ravines to admit of retaining such a gradation as would have been preferred. It has been found practicable, however, so to distribute the fall of the valley as to give an average descent per mile from the foot of plane No. 5, east to Hollidaysburg.

A short distance below this village the rail road will connect with the eastern division of Pennsylvania canal, and the last 1538 feet of the line located, terminating at section 308, would be parallel with the proposed basin. Excluding this distance, and computing from S B M I, to the head of the basin, the length of the eastern division of the rail road will be ten miles and two hundred and seventy-eight poles.

The first 588 poles of the western division of the rail-road passes over ground of a very gentle declivity, sloping in the first instance towards Storm's run, a tributary of Clearfield, and afterwards towards the Laurel swamp branch of the Conemaugh. At the end of this distance, the inclined planes west of the summit commence, the line falling successively at Adam's run, Bear rock run and Ben's creek. A fourth inclined plane is located about three fourths' of a mile below Litzinger's saw-mill, and lowers the line into the valley of Conemaugh.

The graduation between these planes varies between 11–1000 and 22–1000 of a foot for each distance of ten feet, and may be made somewhat more gentle on a definitive location.

Station 214 at the foot of inclined plane No. 4, is 8 miles and one hundred and ninety-one poles from S B M I. From this point to the big bend of the Conemaugh, a distance of nine miles and two hundred and sixty-nine poles, the line is located (with the exception of a short distance from the foot of plane No. 4,) on the north side of the Conemaugh, and is graduated on a slope generally rising to, but in no case exceeding thirteen feet and two tenths per mile. At this point, plane No. 5 west, is located by which the line is lowered ninety-one and a half feet. Between the foot of this plane and Johnstown, nine miles and twenty poles, the Conemaugh is crossed five times so as to obtain for the rail-road the best and most direct line. The trace in this distance nevertheless deviates more from a straight line than on any portion of the route; on this part of the location the graduation is for the greater part of the distance as steep as 26 feet and 40–100 ths per mile, but at no point exceeds this descent.

The line of the rail road terminates at No. 671, near Johnstown, the last 1300 feet being at a convenient distance from an arm of the Conemaugh, which will be converted into a large and commodious basin by raising Livergood's dam and embanking on the opposite flat; deducting this distance, the whole length of the western division of the rail-road from S D M I to the head of the proposed basin, is twenty-seven miles and ninety-three poles, and the whole distance between the two basins thirty-eight miles and fifty-one poles.

The points adopted as points of termination for the rail-road and of connection with the canals east and west of the mountain, are recommended after much consideration. It will be proper to explain to the board at some length, the reasons which have led to the conclusion that they are on the whole the most advisable.

It will be observed, on examination, that the profile of the western part of the proposed rail road from the foot of the inclined plane No. 4, to its point of termination is well adapted to the use of locomotive engines. A motive power may in consequence be adopted on this part of the rail-road, peculiarly eligible, where expedition becomes an object, and better adapted than any other to the case of a profile within the limits of locomotive graduation, and which for other power would not be advantageous. On the other hand there is little doubt that an ample supply of water for locks of even the small lift of five feet cannot be commanded from the Conemaugh, above the confluence of the south branch. This circumstance would have appeared decisive against an extension of the canal above Johnstown, had it been clear that an increased quantity could not have been obtained elsewhere. It was deemed proper, however, to omit no view of the subject, which could with propriety be taken under the instructions given, and which might be desired by the board. Examinations were accordingly commenced with the view of ascertaining what further supply could be commanded at the confluence of the Munster and Ebensburg branches.

It is ascertained that a feeder which would not be expensive, for five and a half miles, may be taken from the Bedford and Cedar swamp branches of the south branch, immediately above their junction, and brought without any material difficulty to a depressed point in the dividing ground between the Conemaugh and South branch. From this point (a little south of William Brookbank's, on the Johnstown road,) it would be necessary to conduct the water by a vault of five feet diameter, a distance of 1000 yards, after which it would be discharged into one of the sources of Ephraim's run, and thence find its way along the bed of that stream to the Conemaugh, two miles above the point in question. A small portion of the waters of the Clearfield might also be commanded without much difficulty, and at several points on the Conemaugh reservoirs of large capacity, could if requisite be constructed.

Under these circumstances, it may be deemed perfectly practicable to extend the navigation west of the dividing ground, by locks of any convenient size, seventeen miles above Johnstown, and it is not to be denied that some very material advantages would flow from such a reduction in the length of the portage. It is believed, however, that these will be overbalanced.

First—By the increased expense of a canal in this distance, locks constructed on any permanent plan would cost as much, or nearly as much as the rail way. To this is to be added the cost of a canal embracing much difficult ground and of a feeder involving a subterraneous passage of the length above stated.

Secondly—By the delay attendant on passing through as many locks as would be necessary to overcome the fall (400 feet) in this distance.

Thirdly—By the increased annual expenses on the canal when completed. This item for repairs and renewals alone might perhaps be equal on the canal and rail road, but a large number of officers would be required on the former work, who might be dispensed with on the latter. Their salaries at the lowest rates at which competent officers could be procured, would form a per centage on the tolls which might be anticipated, worthy

of much consideration, in an estimate of the relative value of either improvement.

Fourthly—By the interruptions to a continued communication between the east and west, which might be anticipated on this part of the line.

These would arise from two causes: 1st, From the peculiar liability of a canal presenting so large an amount of lockage in a short distance, to derangement; and 2dly, the obstruction of navigation by ice at a later period in the spring and at an earlier period in the fall of the year, than on other parts of the route. This last effect would result not only from the greater elevation of this part of the line, but the peculiarly confined character of the Conemaugh valley in this distance.

The subject, however, is submitted with due deference to the better judgment of the board. Should it be their opinion that the advantages of pushing canal navigation west of the Allegheny to the highest practicable point, preponderate over the disadvantages here exposed, it may be expedient to adopt the location of the rail road only as far as plane No. 4 west; and to cause a particular estimate of the expense of a feeder from the South branch, and a canal the remaining distance to Johnstown to be made before coming to a definite decision.

The eastern termination of the rail road appears to be a matter of much less doubt. A basin immediately above Frankstown, would be more easily supplied with water from the Juniata below the junction of the Beaver dam and south west branches, but would possess no other recommendation. The situation is represented as peculiarly unhealthy, and the only building ground would be either a very low flat or steep hill side.—Should the point at which canal navigation will terminate east of the mountain, be as it is believed it will be in time, a large and flourishing depot, some better accommodation would seem to be required for the trade and the inhabitants, whose pursuits may lead them to settle near it. The same supply of water which can be commanded at Frankstown, may be commanded by the feeder lines laid down in the place herewith submitted, at a point peculiarly picturesque, said to be uncommonly healthy, and presenting every advantage for the head of canal navigation; and one to which it may be extended with a very slight increase of lockage.

In the description of the line of the rail road, a mere outline of the trace adopted has been given. The consideration of the points at which stationary power must be adopted, and those at which inclined planes may be admissible, has been reserved; because a previous discussion of some points, and an exposition of certain principles on which this will depend will be necessary.

Wherever on a line of rail way a trade can be *regulated*, self-acting planes are available. If the line of railway descend, and the trade preponderate in the direction of the descent, stationary power at inclined planes becomes altogether unnecessary. If a summit is to be crossed, stationary power must be made use of to an extent sufficient to overcome the preponderance of the heavier trade, and the friction of the machinery employed in raising it; but this heavier trade after ascending, may be made use of to lift up a lighter returning trade.

Where of course, a trade on a line of railway is nearly equal, power to a certain extent becomes indispensable at each plane, in either direction from the summit. Its amount may, however, in all cases be materially diminished by such a regulation of the trade as will bring trains of waggons to the foot and head of planes at the same time.

There can be but little doubt that the trade on the contemplated line of rail way, must be in a short time a much heavier one from west to east, than in the opposite direction. The bituminous coal of the Allegheny, which even now is taken ocasionally over a very bad road to the villages on the Juniata, will probably of itself be equal in weight to the whole amount of iron and merchandize returning.

Under these circumstances, powerful steam engines (should steam be the power adopted), will be required at planes No. 1, 2, 3, 4 and 5, west of the summit; but if the trade be a regulated trade, the gravity of descending trains will be nearly or quite sufficient east of it.

Such a result may be attained in two ways. Either the privilege of transportation may be leased for a term of years, to individuals or a company, who should transport at fixed rates, or it may be effected by agents of the commonwealth at specified rates for toll and transportation.

I am aware of the preference which will always be given in Pennsylvania to public highways, on which the fullest competition may have play, and that very plausible objections may be made to either of the plans suggested. It is believed, however, that one or other disposition of the portage, at any rate for some years to come, is recommended by considerations of paramount weight. 1st, By the diminished amount of power required for any given amount of business, should the proposed rail road be a public highway, five steam engines averaging seventy horse power each, at an annual expense in fuel, wear and tear, and attendance of $15,000, or other stationary power equivalent to them, will be required in addition to those stated to be necessary west of the summit; and at least one-third more horse power will be necessary on those portions of the rail road on which it is employed. To understand this remark, it will be necessary to advert to the circumstance that a horse can for a short time sustain a stress of which he would not be capable for a series of hours. Should transportation on the contemplated rail way be effected by lessees or agents of the commonwealth, horses operating in relays would be used on the short levels of the road, whilst locomotive engines would be employed on the longer. On these short levels a horse would be capable of a very great effort in ascending, because this effort would be of short duration, and he should be relieved in returning. It would be otherwise, however, if it was a question of travelling the whole length of the rail road, ascending and descending in a trip an elevation of 2270 feet. His load it will be obvious in this case, could not very greatly exceed what would be his fair load from his starting point to the summit level.

Secondly—By the opportunity which it affords of dispensing with *crossing places and turns out*, between the inclined planes. These on a line of rail road in a mountainous country, add materially to its expense, in consequence of the increased width of roadway they require, occasionally at difficult points and on steep slopes; but could not be dispensed with, without so regulating the traffic as that trains travelling in either direction would progress with equal speed.

Thirdly—By the superior economy, as well as expedition of locomotive power. This, of course, must be given up between plane No. 5 west, and Johnstown, should the rail road be a public highway; as locomotive engines and horses could not be advantageously made use of on the same parts of the road. A further inconvenience would result from this circumstance, which may require some explanation.

The trade on the contemplated improvement must necessarily be irregular. During three or four months of the year at least, the canals may be expected to be to be bound up by ice, and at midsummer there will probably be but little trade to or from any point beyond Pittsburg, in consequence of the difficulties attending the navigation of the Ohio at that season. It can scarcely be expected that any competition on the proposed rail road, if a public highway, would insure adequate means of transportation for what might accumulate at each extremity of the road during those periods of the year when all the avenues of trade would be open. This end, however, will be attained, if transportation is effected by the commonwealth, or by individuals to whom the privilege shall have been leased. In the latter case conditions may be affix-

ed and requisitions made, which will be easily complied with, both because a given amount of power will be productive of a larger result under this than under any other arrangement; and because a surplus number of locomotive engines may be retained on those parts of the road on which they can be used, without incurring any further expense when they may be unemployed, than the amount of interest on their cost.

It remains to be added, that should transportation on the proposed rail road be effected by agents, or responsible lessees of the commonwealth, the objections which have been made to the Pennsylvania line of communication, as presenting in its portage danger of delay and uncertainty, will be in a great measure avoided; and it may not be digressing too far or hazarding too much, to express the confident belief that under such a system, transportation may be effected, not only more expeditiously, but as cheaply and with more certainty by the portage, than it could have been by a water communication across the mountain, had this last been attainable.

The annexed paper marked A, presents a description, and an estimate in detail of each division of the rail road, divided into natural sections. It will be proper in this place to discuss the style of execution of the proposed improvement.

The width of the roadway formation will be twenty-one feet. This will admit of two tracks of five feet width each, an intervening space of three feet, a foot path and drain on sloping ground; or of two tracks and two foot paths on embankments. In the few cases of deep cuttings which occur, an extra width proportioned to the length and depth of the cut will be required.

Embankments, when but small vents are requisite to pass streams or spring torrents, are generally preferred to bridges, and in the formation of inclined planes where the profile of the surface is much depressed below that of the plane, the requisite graduation is attained by embankments or walling, and in no case by trusses. Undoubtedly a considerable saving in first cost would accrue from the substitution of wooden bridges, and frames of timber for the heavy walls and embankments which are contemplated. When it is recollected, however, that the great weight of a train of rail road wagons would expose such structures to a stress under which they would occasionally yield, and that the destruction of one of them from this cause, or by a mischievous incendiary, might produce an interruption to trade during weeks or months, the propriety of dispensing with them, except under particular circumstances, will be at once perceived.

In the superstructure of the rail road more economy may be exercised than in grading or roadway formation. The cheapness of timber, and the facility with which they may be renewed, will recommend in the first instance at any rate, wooden rails plated with iron bars in preference to rails of malleable or cast iron. A superstructure of this description is recommended by the further consideration that a less expensive description of iron may be made use of for plating wooden rails, than would be required for rails entirely of metal.

Of course on those parts of the rail-road on which steam power is contemplated, some extra strength will be requisite. The wooden rails must be stouter, and their points of support more frequent than on other portions of the work. It will also be proper to give to the plate rails a somewhat different section and some increase of weight. On the other hand some diminution of expense will be occasioned by dispensing with a horse path on this portion of the road way.

The following construction is recommended for the superstructure of the railroad (except at inclined planes) between Hollidaysburg and the foot of inclined plane No. 4, west, or on that part of the rail road on which horse power is contemplated.

Blocks of stone 2 feet 6 inches long, 2 feet deep, and 15 inches wide, to be embedded every 8¼ feet apart on a layer of broken stone of the depth of 6 inches. Each of these blocks to be drilled at two points to the depth of eight inches, and its surface to be levelled with that of the roadway. On them, blocks of white oak or locust notched for the reception of rails to be attached with locust trunnels. The ends and points of support of the wooden rails to be secured in these blocks by a key so as to admit of removal, raising or shifting to the one side or other of the groove, in the simplest manner. The advantages of this construction are believed to be material, not only the rail is elevated and less exposed to the operation of causes which produce decay, but the inconvenience arising from a slight settling of the foundation may be at once remedied by a removal of the key and raising the rail, or if the parallelism of the rail way should be disturbed by shifting the rail laterally.

The least weight to which it has so far been found expedient to reduce locomotive engines, including the fuel and water with which they should be furnished at each point of supply, is six and a half tons, or about 2½ tons more than the weight of the cars and their loads which are contemplated on the rail road. To meet this increased stress, the following construction is proposed on those parts of the rail road, on which machinery will be employed; or between plane No. 4, west, and Johnstown.

Two feet cubes of stone to be imbedded as before on broken stone, 7 feet apart from centre to centre in the direction of the rail road, and on these cubes sills of white oak or locust extending across the track to be bolted. The wooden rails to be keyed into the sills as in the former instance into the blocks. The only difference in the *principle* of the two constructions, it will be observed consists in extending the sills across the rail road track. This construction which would not be advisable on other parts of the rail road on account of its interference with the horse-path, is recommended on that portion on which locomotive engines will operate on account of its superior solidity.

Rails 6½ inches by 10 inches, and plate rails half an inch by two inches are proposed for those parts of the rail road on which horse power will be employed. For the remainder of the road and the superstructure of inclined planes, rails 8 by 12 inches, and plate rails having a cross section equal to 1 4-10ths inches will be required.

The whole cost of the contemplated improvement, it will be observed, is estimated at $936,004 87 cents.—The prices allowed are deemed liberal, and believed to be sufficient to execute each description of work involved in the rail road in the most substantial manner. It would of course be unwise in the extreme to execute otherwise a line of communication on which not only the value of two great divisions of canal, but of many other improvements in the state must essentially depend.

Next in order to "the construction of a rail way between the waters of Juniata and Conemaugh, overcoming the summit by means of stationary engines, and self-acting planes," attention was directed to the construction of a Macadamized turnpike of the best kind tween the same points.

No examinations have been made *especially* in reference to this object during the past season, nor do any in addition to the surveys made by authority of the state in the summer of 1828, appear to be required. It results from these, that a tolerably direct route within the limit of one degree of graduation cannot be had between the points of contemplated connexion, and that whilst a rail road of the most advantageous description between Johnstown and Hollydaysburg will not much exceed thirty-eight miles, a Macadamized turnpike of the graduation above stated, between Johnstown and the head of the basin contemplated at Frankstown, (only two miles lower down) cannot fall much, if at all, short of fifty.

It may sometimes be a question whether an inferior improvement of diminished length should not be pre-

ferred to one of superior order, but by which the distance between two points would be materially increased. When, however, the reverse is the case, and the trade to be accommodated is considerable, such a question we should think could very rarely arise. It will be proper, however, to institute a more precise comparison between the two kinds of improvement submitted.

Such a comparison involves three points; the first cost, the annual expense, and the *cost* of *transportation* on each species of improvement.

The estimates of Mr. Roberts (see Canal Documents, 1828, p. 216)* give $506,145 34 cents, as the cost of a Macadamized road, 36 feet wide, on the shortest of the routes surveyed by him at a graduation of one degree. To this estimate remains to be added an allowance for contingencies and superintendence, so that the whole cost of such a road may be stated without danger of excess at, at least $550,000 between Johnstown & Frankstown, or at least $528,000 between Johnstown and Hollydaysburg. This would leave a difference in cost between the Macadamized rail road of $408,000.

The difference in their annual expense is a matter of more difficult determination. Whilst the necessary expenses of a rail road are under any circumstances considerable, they increase in a very slight ratio with the increase of its trade. Those of a turnpike on the other hand increase in nearly the same ratio. It certainly will not be rating too highly the business which may be anticipated on the Allegheny portage to suppose that the annual repairs of a turnpike which would accomodate it, would at least equal those of repairs and renewal, (setting aside the expenses of fixed and locomotive power,) on a rail-road. If the supposition be correct it will remain only to compare the cost of transportation on the rail road and turnpike, with the first cost of the respective improvements.

If the following calculations are correct, (and no doubt is entertained that they are not too favourable to the rail road,) they shew that with a trade limited certainly in comparison with what may be anticipated, it would form notwithstanding its increased cost, much the most advisable connection.

Estimating the trade between Johnstown and Hollydaysburg at 30,000 tons going easswardly; the trade going westwardly to be taken in return loads; and that transportation is effected during 250 days in the year.—The average transportation eastwardly would be 120 tons per diem.

The average load on a horse on a Macadamized turnpike, would be about twelve cwt. or 3-5ths of a ton.—The time occupied in a trip 7 days, viz: 5 going and returning, and one at each point of termination for rest and loading.

Assuming these data 120÷5-3÷7=1400 horses would be required on a turnpike between Johnstown and Hollydaysburg, and estimating 5 horses a team, 280 drivers.

Five locomotive engines, forty horses, and thirty drivers and tenders, would more completely accommodate the same trade on a rail road. Presuming the wear and tear, and interest on turnpike and rail road wagons to be equal, and estimating the daily expense of a locomotive engine as equal to the interest on the cost, the wear and tear and expense of five horses, the saving in motive power would be equal to the wear and tear, expense and interest on the cost of 1335 horses and 250 drivers.

The former item of expense could scarcely be less than 30 cents per day per horse during the whole year, and an average of sixty cents per day for faithful and trusty drivers, would probably not exceed what their services would command.

Then 1335÷30÷250÷60=550 dollars and 50 cents per day, or 200,932 50 per annum, would be the difference in the expense of transportation on a turnpike and Macadamized road.

Deducting from this amount the expense of fuel and attendance for five stationary engines, estimated at $2,200, each (1,100) and of attendance at five self-acting planes, at 5,000, we have still left in favour of the rail road a saving in the annual cost of transportation of 184-932 52 or a sum equal to nine times the interest on the difference in the first cost of the two improvements.—The commonwealth may of course indemnify herself largely for any additional outlay she may make, and yet leave her citizens largely the gainers.

It will be seen at once, that with a trade greater than that on which the foregoing calculation is predicated, the balance in favour of the rail-road would not only be greater, but increased in a still greater *ratio*, because the expense of the rail-road for fixed power and attendance at planes, would be very slightly increased, whilst those for repairs on the turnpike would increase in a ratio nearly correspondent with its increase of business.

It may not be out of place here to correct some misapprehensions which appear to exist in relation to the value of Macadamized roads as a means of transportation for merchandize and produce.

Travellers who have visited Great Britain, have been struck with the smoothness and easy graduation of the roads which traverse every portion of that highly improved country, and have returned to America enamoured of an improvement which owes its success rather to the circumstances under which it was introduced, than to the character of the improvement itself. It was long after canals had been constructed in every quarter of England, and the benefits of improved communication been extended into its more broken and mountainous districts by rail roads, that Macadamized roads were introduced. They were wanted as a means of accommodation for the greatly increased travelling which had been occasioned by an immensly extended internal and external commerce, and as such, have answered in an admirable degree the end for which they were desired. It would have been otherwise however, had they been made use of to effect the heavy transportation of the interior of the country, or to convey to the seaboard the products of its mines and manufactories, destined for foreign ports.

The small fragments of stone of which it is essential that the covering of Macadamized roads should consist, triturate very rapidly even under the light weights conveyed on them in England. Although it is extremely rare that any heavier vehicle than a stage coach is seen on an English turnpike, yet the annual expense of repairs on those which are much travelled, is estimated at 100*l.* sterling per mile.

Were the carriages used on them heavier, their capping would crush in pieces much more rapidly. The subject has been ingeniously illustrated by a comparison drawn from the effect of a large and small hammer. A pebble, it has been correctly observed, which would resist a severe blow from a hammer of two pounds, would be crushed into powder by one of moderate intensity from a hammer of four pounds.

The repairs of a Macadamized road, on which heavy wagons were used, would not only be extremely expensive from the excessive destruction of materials, but also from the constant labour which would be required to fill up the ruts in the road, which the wheels of such wagons would be continually wearing. No plan which has yet been fallen on will avoid this on a *good* road.

Large wheels, on a bad road, will avoid the deepening of ruts beyond a certain point, but if the materials of which the road is composed are small, they must yield under pressure, and the evil is only aggravated with large wheels, because such wheels cannot press *uniformly* on a rounded surface, which a Macadamized road should always have; and would cut more deeply at their corners than narrower wheels, which would have a more equal bearing.

It is proper to mention before leaving this subject, that good materials for the capping of a Macadamized road would be had with difficulty in the neighbourhood of either of the lines serveyed. The sand stone of the Al-

*See *Reg. vol.* 3, *pp.* 277–290.

legheny is sometimes hard, but pulverizes easily under pressure, and bonds together but indifferently.

The third point to which attention was directed by the resolutions of the board, was "the suggestion of any other plan which might be deemed best calculated to accommodate trade."

Under this head it may be observed, that next to a good water communication, no plan is in general deemed mere eligible for the accommodation of a large trade than a rail road, overcoming elevations by means of stationary power and inclined planes.

The profile of the line of rail road surveyed across the Allegheny mountain,may certainly be considered in a high degree favourable. More than two thirds of the distance between Johnstown and the summit level, as has been before observed, it is well adapted to the use of locomotive power. On the remaining third, the ascending graduation is but small, and may be still further reduced by a slight increase in the rise of each lift, without any material accession of expense East of the summit the profile of the rail road is not quite as favourable as west of it, but on the whole may not be considered ineligible for a trade preponderating in this direction.

The *plan* of the road is not more unfavourable than its profile. At two or three points it may be advisable to turn on a smaller radius than five hundred feet, but short and sudden curvatures will be but very seldom required.

Nature then has not shown herself churlish in the distribution of facilities for the contemplated connexion, and whilst she has maintained her barrier of partition between the waters of the Chesapeake and Mississippi, at the head of the Juniata, as at most other points, unbroken, she has presented perhaps as many facilities in this quarter for overcoming it by an improvement of the best description, as could reasonably have been expected.

On the other hand, she appears with equel energy and a boldness scarcely to be mistaken, to have denounced any plan of effecting this object by graduation. The wide and deep ravines with which both the eastern and western slopes of the Alleghemy are torn, and which have been found so advantageous for the location of inclined planes, would have presented obstacles to a graded road of any kind, which could only have been overcome at an enormous expense, or avoided by a very great increase in the length of a line.

Under these circumstances, it is not hazarding too much to say, that no plan of improvement can be offered to the consideration of the board more eligible than that submitted under the first head of this report. It may, however, be a question whether a cheaper and simpler power cannot be substituted at inclined planes for that of steam, which has been contemplated in the annexed estimate.

Water power is available with but little fall, wherever a sufficiently large body can be commanded. It is not the less so where the reverse is the case, that is to say, where the volume of water though small, can be commended for a very great elevation.

In but one case on the line of the rail road can a sufficiently large body of water be commanded at an inclined plane, to act in the ordinary manner on a water wheel. At the Big Bend of the Conemaugh, the whole stream may be had at a point half way down the plane, with the advantage of a head and fall of fifty feet, if necessary, affording, of course, for the inclined plane at this point, a greater amount of power than can in any contingency be wanted.

At the other inclined planes west of the summit, considerable streams of water could not be commanded; but at three of them, small and constant streams may be brought, without encountering any very serious expense, to the head or midway of the planes. Two plans are deemed worthy of suggestion to the board by which the power they would afford may be made use of.

The first plan proposes a piston cylinder and crank, in all respects similar to those of the steam engine.—The water to be conveyed by pipes with the advantage of the greatest head which can conveniently be had, and to be admitted alternately above and below the piston, (as steam from the boiler of a steam engine,) by means of a four-way-cock or valves; the latter to be opened and shut as in the steam engine, by means of a rod attached to the working beam. The principle on which this machinery (usually denominated the *water pressure engine*) is dependent for its power, it will be observed is the same as that of the hydrostatic press of Bramah, from which such important results have of late years been derived.

The second plan proposes the use of water in cisterns as a counterpoise to ascending weights, reducing the operation ascending west as well as of the summit, to that of self-acting planes. The annexed drawing and specifications marked B,exhibit its details. It is proper to observe to the board, that this plan of overcoming elevations is claimed as an invention of the undersigned, and under a favourable impression of its applicability under many circumstances, was secured by patent, before he had the honor of being engaged in their service. He will, of course, be excused from any comparison of its advantages or disadvantages with those of the other plans submitted.

It may be desirable before closing this report, to present to the view of the board, some considerations which have governed in relation to the location of inclined planes, on the proposed rail road, which it has not been found convenient before to introduce.

Two points have been deemed to be of essential importance in the location of inclined planes. 1st that they should be straight, and that the line of the rail road should for a short distance from the head and foot of each plane, be in the same direction with the plane; and 2ndly, that the plane itself should either have an uniform inclination with the horizon, or an inclination gradually diminished betwee the head and foot of the plane. On a plane to any extent curved in its plan, a greater loss of power and wear and tear of cable and rope will always be sustained, than on a straight plane, and without a stage of some extent at the head of the plane in the same direction with the plane, a very extensive business cannot be accommodated; and should the plane be so far curved, as to prevent the manager at the head of the plane from embracing its whole extent under his view, the operation of raising and lowering trains must be conducted by signals, and often disadvantageously.

On planes on which power is to be applied,an inclination slightly diminishing towards the foot of the plane is most desirable; on self-acting planes, (where the fullest useful effect of the gravity of descending bodies is desired,) the most advisable profile is an approximation to the cycloyd. It is in either case a disadvantageous feature, if the plane becomes steeper towards its foot. In the one case, the engine at the commencement of its labor, is compelled to exert a greater force than is afterwards required. In the other, a descendiug train of wagons may acquire in consequence of its increased stress, combined with its accelerating force, a momentum not to be controlled without difficulty by a brake, and attended with much hazard.

It was further an object in the case under consideration, to reduce the number of planes as far as practicable. Such a reduction was peculiarly recommended by the saving of time in transportation which it insured, and the superior simplicity of any system of transportation which might be adopted on the completion of the work.

The bold outlines of the country over which the railroad has been located, did not admit of prescribing to it too many conditions. Of course in complying with those which were deemed essential,secondary considerations have been occasionally waived.

The accompanying volume of profiles marked C, presents a view of the ground which has been selected for the different planes east and west of the summit, and the general inclination recommended at each plane.—This of course does not correspond in all cases with that which looking only to the trade and its direction, would be deemed the most advisable, but deviates as little from such a profile as a due regard to circumstances would permit. The great essentials in the location of planes above explained, it has been found practicable with one exception to observe. Plane No. 2 east has a curvature in its course corresponding to a versed sine of 40 feet on a chord of 672 feet. It may be proper to mention also, that at plane No. 5, west, it will be necessary to arrive on, and leave the foot of the plane by a turning platform.

It will be observed that the elevation overcome, and angle of inclination adopted at the different lifts, differ very materially. These differences would be compensated on the execution of the work, by adopting at each point, machinery of suitable weight and power. The proportions allowed in the estimate are deemed a sufficient approximation for the purpose for which they are used, but a nice calculation of strength for each portion of the machinery employed, will of course be requisite, in order to avoid on the one hand the loss of power which would be sustained by the use of cables and other fixtures unnecessarily cumbrous, or the disastrous consequences which might result from the want of a due degree of strength in their proportions.

In addition to the documents above referred to, two volumes of topographical sketches, and two field books, presenting all farther information on the subject, believed to be material, are herewith presented to the board.

All which is respectfully submitted,

MONCURE ROBINSON,

Nov. 21, 1829. *Civil Engineer.*

[The several calculations submitted by the Engineer, will be published in our next number.]

METEOROLOGICAL REGISTER,

KEPT BY *THOMAS SMITH*, AT THE PHILADELPHIA LABYRINTH GARDEN.

JANUARY, 1830.

Days.	*Rain.*	*Moon.*	*Thermometer*			*Wind.*			*Atmospheric Variations.*		
	Inches.		7	12	3	7	12	3	7	12	3
1	——	1st qr.	30	40	40	North	North	North	Clear	Clear	Clear
2	50-100	"	32	50	49	NE	NE	WbyN	Clear	Clear	Clear
3	25-100	"	30	49	48	NW	NW	SW	Clear	Clear	Cloudy
4	——	"	30	41	40	W byS	W	W	Cloudy	Clear	Clear
5	——	"	30	50	50	W byS	SW	SW	Cloudy	Cloudy	Cloudy
6	——	"	35	46	46	W byS	SW	SW	Cloudy	Cloudy	Cloudy
7	1-100	"	26	40	40	W byS	SW	SW	Cloudy	Clear	Clear
8	——	Full.	36	46	46	SW	SW	SW	Clear	Clear	Clear
9	——	"	12	26	26	NW	NW	NE	Clear	Cloudy	Cloudy
10	1 12-100	"	20	30	30	SW	W	NW	Cloudy	Cloudy	Cloudy
11	——	"	26	36	36	NW	NW	NW	Cloudy	Clear	Clear
12	——	"	20	30	30	NW	NW	NW	Cloudy	Cloudy	Cloudy
13	——	"	26	36	36	SW	W	SW	Cloudy	Cloudy	Cloudy
14	——	"	28	38	38	W	SW	NW	Cloudy	Cloudy	Cloudy
15	40-100	"	30	38	37	NE	NE	NE	Cloudy	Cloudy	Cloudy
16	——	Last qr	38	55	54	NW	W	W	Cloudy	Cloudy	Clear
17	50-100	"	31	44	40	NW	NE	NW	Clear	Cloudy	Cloudy
18	——	"	22	30	28	NW	NW	NW	Clear	Clear	Clear
19	——	"	18	32	34	NW	SW	SW	Clear	Clear	Clear
20	——	"	34	48	48	SW	SW	SW	Cloudy	Cloudy	Cloudy
21	——	"	28	36	36	Wby N	NW	NW	Clear	Clear	Clear
22	——	"	28	40	40	SW	SW	SW	Clear	Clear	Clear
23	——	"	30	30	30	W	NW	NW	Clear	Clear	Clear
24	——	New m	14	22	22	NW	NW	NW	Clear	Clear	Clear
25	——	"	20	40	41	SE	SE	SW	Cloudy	Cloudy	Cloudy
26	Sn. 5-100	"	16	28	27	NW	NW	NW	Clear	Clear	Clear
27	1-100	"	19	35	36	SW	S byW	S byW	Clear	Cloudy	Cloudy
28	——	"	18	24	24	SW	NW	NW	Cloudy	Cloudy	Cloudy
29	3-100	"	20	24	23	N by E	NE	NE	Cloudy	Cloudy	Cloudy
30	——	"	14	16	16	NW	N by E	N by E	Cloudy	Clear	Clear
31	——	1st qr.	7	22	21	Wby N	SW	SW	Cloudy	Cloudy	Cloudy
	2 87-000		25	36	36	Winds—NW 32, SW 27, NE 9, SE 2, W 8, N 3, WbyW 3, NbyE 3, SbyW 2, WbyS 4, Clear 44, Cloudy 49 observations.					

REMARKS.

2d. A little Rain this morning; a very fine day; Primroses and Violets in flower, in the open ground, in the Philadelphia Labyrinth Garden.

5th. A white frost this morning.

7th. A little snow, and when melted 1-100; fine day.

8th. This morning like April.

9th. A little Snow.

10th. A Rainy day.

11th. A very high wind.

14th. A thick fog; Mr. Lee brought ice from the ponds 2½ inches thick. A little Rain.

25th. Ice brought from the ponds, 5 inches thick, to the ice-houses in the city.

26th. Snow 1 inch thick on the ground, and when melted 5-100; high wind. 27th. A little Snow.

29th. Snow 3-100ths; high wind.

31st. Delaware river frozen over.

Thermometer in the month—highest on 16th, 55—lowest on 31st, 7—range, 31.

Mean of the month, 32½°, which is 1½° lower than the average of the 22 years from 1807 to 1828, according to table in our vol. I, p. 131.

The quantity of rain which fell in January, according to the register at the Pennsylvania Hospital, was 1 68-000. The quantity of rain per register at Health office, was 1 89. We cannot account for these differences, if the observations are all made with equal care.

DESCRIPTION OF THE

EASTERN PENITENTIARY OF PENN'A.

THE prevention of crimes and the reformation of criminals, in lieu of the vindictive infliction of pain on offenders, are *now* almost universally acknowledged to be the only legitimate objects of human punishments. Policy and humanity equally dictate the application of severity sufficient to prevent offenders repeating their crimes, and to deter others from following their example. The intentional addition of any further suffering constitutes cruelty. However obvious this theory may appear at the present day, its justice has been but recently acknowledged; and in practice it is to the present hour almost unknown throughout the greater part of Christendom. The gratification of vengeance and securing the persons of convicts to prevent the *immediate* repetition of offences, appear to have constituted the only design of imprisonment, until near the conclusion of the last century. In the prisons at that period, the mixture of all ages, ranks and sexes, into one corrupting leavened mass of shameless iniquity, and the unrestrained intercourse which was permitted day and night, rendered the consignment of a juvenile offender to these abodes of depravity, a certain sentence of moral death: he who entered their gates a novice in guilt, accomplished his education in villainy, and leaving character, shame, independence, and every incentive to voluntary industry and virtue within their walls—departed an adept in crime, ignorant only of his duties; prepared to practice at the expense of society, those lessons of vice which its folly had forced on his acquaintance, and almost compelled him to exercise as a profession when discharged.

Such was the condition of these colleges of vice, as they have been too correctly denominated, when the *first* association for the purpose of ameliorating Prison Discipline was formed in Philadelphia on the 7th of February, 1776. This society is therefore entitled to the distinguished honour of leading the way in this novel and important subject. It is the venerable parent of the numerous institutions for the promotion of similar objects which are now in active progress throughout the world. The revolution suspended the existence of this association, which was however revived In 1787, under the name of the Philadelphia Society for alleviating the miseries of Public Prisons, and has ever since continued to pursue the labours of benevolence.

The contamination resulting from the association of prisoners, and the prejudicial effects resulting from their acquaintance with each other, induced this body to petition the legislature to separate the convicts, and finally to adopt the only effectual system, viz: separate or solitary confinement. The celebrated law which was enacted April 5th, 1790 authorised the construction of 30 solitary cells, which were consequently built and occupied. Numerous other improvements were introduced, the effects of which were soon visible in the reduced number of convictions, and in the reformation of the inmates of the prison. This institution, the first in which the system of solitary or separate confinement was adopted, rapidly acquired celebrity throughout the Union, and many parts of Europe, where it has been subsequently imitated. During the last year, upwards of 4000 convicts, have been sentenced to solitary confinement in the kingdoms of Great Britain and France alone.

Causes, which it is unnecessary to describe, in a few years crowded this Penitentiary with inmates, and consequently rendered the operation of the new system almost impracticable. Repeated memorials of the society, and of other philanthropists, finally induced the Legislature of Pennsylvania, in 1817, to authorise the construction of a prison at Pittsburg, and in 1821, another at Philadelphia, in which the separate confinement of every convict, day and night, could be fully accomplished. The latter of which is the subject of the present notice.

The EASTERN STATE PENITENTIARY is situated on one of the most elevated, airy, and healthy sites in the vicinity of Philadelphia. Large sums have been expended for the purpose of giving an unusual degree of solidity and durability to every part of this immense structure, which is the most extensive building in the United States. The ground occupied by it, contains about 10 acres. The materials with which the edifices are built is a greyish granite, or gneiss, employed in large masses; every room is vaulted and fire proof. The design and execution impart a grave, severe and awful character to the external aspect of this building. The effect which it produces on the imagination of every passing spectator, is peculiarly impressive, solemn, and instructive. The architecture is in keeping with the design. The broad masses, the small and well proportioned apertures, the continuity of lines, and the bold and expressive simplicity which characterize the features of the facade, are most happily and judiciously combined. The originality of the plan, the excellent arrangement and execution of the details, display the taste and ingenuity of the architect, to whom our country is indebted for some of her noblest edifices—our fellow citizen, Mr. John Haviland. The laborious and gratuitous services of John Bacon, Esq. the Chairman of the Building Committee, and some of the other Commissioners, are entitled to our gratitude. The total cost of this building, when finished, will be 432,000 dollars. We are not advocates of inconsistent or meretricious decoration, but we may express our gratification that no unwise parsimony rendered the aspect or arrangement of this institution an opprobrium to the liberal, humane, and enlightened character of our commonwealth.

This Penitentiary is the only edifice in this country which is calculated to convey to our citizens the external appearance of those magnificent and picturesque castles of the middle ages, which contribute so eminently to embellish the scenery of Europe. The front of this building is composed of large blocks of hewn and squared granite; the walls are 12 feet thick at the base, and diminish to the top, where they are 2¾ feet in thickness. A wall of thirty feet in height above the interior platform, encloses an area 640 feet square: at each angle of the wall is a tower for the purpose of overlooking the establishment; three other towers, which will be presently described are situated near the gate of entrance. The facade or principal front, is 670 feet in length, and reposes on a terrace, which, from the inequalities of the ground, varies from three to nine feet in height; the basement or belting course, which is 10 feet high, is scarped, and extends uniformly the whole length. The central building is 200 feet in length—consists of two projecting massive square towers, 50 feet high, crowned by projecting embattled parapets, supported by pointed arches resting on corbels or brackets. The pointed ⁊munioned windows in these towers, contribute in a high degree to their picturesque effect. The curtain between the towers is 41 feet high, and is finished with a parapet and embrasures. The pointed windows in it are very lofty and narrow. The great gateway in the centre is a very conspicuous feature; it is 27 feet high, and 15 wide, and is filled by a massive wrought iron portcullice, and double oaken gates studded with projecting iron rivets, the whole weighing several tons; nevertheless, they can be opened with the greatest facility. On each side of this entrance, (which is the most imposing in the United States,) are enormous solid buttresses, diminishing in offsetts, and terminating in pinnacles. A lofty octangular tower, 80 feet high, containing an alarm bell and clock, surmounts this entrance, and forms a picturesque proportional centre.

On each side of this main building (which contains the apartments of the warden, keepers, domestics, &c.) are screen wing walls, which appear to constitute por-

tions of the main edifice; they are pierced with small blank pointed windows, and are surmounted by a parapet; at their extremities are high octangular towers terminating in parapets pierced by embrasures. In the centre of the great court yard is an observatory, whence long corridors, eight in number, radiate: (three only of these corridors, &c. are at *present* finished.) On each side of these corridors, the cells are situated, each at right angles to them, and communicating with them only by small openings for the purpose of supplying the prisoner with food, &c., and for the purpose of inspecting his movements without attracting his attention; other apertures, for the admission of cool or heated air, and for the purpose of ventilation, are provided. A novel and ingenlous contrivance in each cell, which has been frequently described, prevents the possibility of conversation, preserves the purity of the atmosphere of the cells, and dispenses with the otherwise unavoidable necessity of leaving the apartment, except when the regulations permit—flues conduct heated air from large cockle stoves to the cells. Light is admitted by a large circular glass in the crown of the arch, which is raking, and the highest part 16 feet 6 inches above the floor, (which is of wood, overlaying a solid foundation of stone) The walls are plastered and neatly whitewashed; the cells are 11 feet 9 inches long, and 7 feet 6 inches wide: at the extremity of the cell, opposite to the apertures for inspection, &c., previously mentioned, is the door-way, containing two doors; one of lattice work, or grating, to admit the air and secure the prisoner; the other composed of planks to exclude the air, if required; this floor leads to a yard (18 feet by 8, the walls of which are 11½ feet in height) attached to each cell. The number of the latter in the present plan is only 266, but it may be increased to 818, without resorting to the addition of second stories. We have had an opportunity of examining many prisons, and other similar institutions in Europe and this country, but we have never seen a building so admirably adapted to the purposes of security, seclusion, health and convenience, as this Penitentiary. The rooms are larger, viz. containing more cubic feet of air, or space, than a great number of the apartments occupied by industrious mechanics in our city; and if we consider that two or more of the latter frequently work or sleep in the same chamber, they have much less room than will be allotted to the convicts; whose cells, moreover, will be more perfectly ventilated than many of the largest apartments of our opulent citizens.

The convict, on his entrance, after the customary examination, ablution, medical inspection, &c., is clothed, blindfolded, and conducted to his cell, where he remains locked up; and after a patient and careful inquiry into his history, and the delivery of an appropriate address to him on the consequences of his crime, and the design to be effected by his punishment, he is abandoned to that salutary anguish and remorse which his reflections in solitude must inevitably produce. Every means which have been devised by philanthropy and experience for effecting reformation will be zealously applied. The labour in which the convicts will be employed, is considered as an alleviation, not an aggravation of his sentence. Labour prescribed as a *punishment* is an error in legislation, founded on an ignorance of the feelings, the desires and antipathies, the habits, and associations of mankind: the tedious hours spent in solitude will be a punishment sufficiently severe, without rendering the infliction of hard labor, *for this cause*, necessary. The want of occupation will produce a feeling of tedium or irksomeness–the state of mind in which labour or employment will appear to the convict—perhaps for the first time in his life, as a means of preventing uneasy feelings, of producing relief and pleasure; and as the powerful influence of association is acknowledged, this beneficial feeling will become habitual, and after the discharge of the convict from his durance, will be a most effectual safeguard from the temptations of idleness. Accordingly, persons duly qualified are employed to teach the prisoner suitable trades, and to instruct him in religion, and in the elements of learning. The prohibition of all intercourse with society, is not, therefore, continual; the visits of the *virtuous* cannot injure, and must benefit the majority of the prisoners, between whom, *alone*, all communication is rendered impossible. The degree of seclusion to be practised, or of labour and other alleviations permitted, may be varied with the varying dispositions of the prisoners. Regular exercise in the yards, in the open air, is permitted, and required when necessary; provided that no two adjoining yards be occupied at the same time, for the purpose of preventing conversation.

From this outline of the system it is obvious that the charge of cruelty, which ignorance and misrepresentation have attempted to attach to it, is untenable. The humane and intelligent, who have sanctioned its adoption in our community almost unanimously, certainly require no defence of the purity of their motives. Among the advocates of this system in Europe, we may refer to Howard, Paul, Eden, Mansfield, Blackstone, Paley, Liancourt, Villerme, &c.; and in this country, to the venerable Bishop White, whose whole life has been but one prolonged illustration of that religion which he professes, Dr. Rush, Bradford, Vaux, Wood, Sergeant, Livingston, and many of our most eminent citizens.—The intrinsic and obvious excellence of the plan afforded a powerful argument for its adoption upwards of 40 years since. The partial experience of its merits has been beneficially experienced in our State and other parts of the Union, notwithstanding the numerous disadvantages which have heretofore attended the trial.—The only failures which have occurred in other States, are unquestionably attributable to the absurd and culpable manner in which the process has sometimes been conducted. The experience of several of the European states, as well as of our own commonwealth, incontestably proves that this system of Prison discipline is the most efficient which the wisdom of philanthropists has heretofore devised; that, when administered in a proper manner, the reformation of the great majority of criminals is practicable; that no injury to the health, mental or bodily, of the convicts occurs; that the severity is sufficient, not only to operate on the inmates of the prison, but to deter others by the example of their suffering; and finally, that as a mean of preventing crimes, it is in fact the most economical. A superficial view of this subject has too frequently led to erroneous conclusions in some of our sister States. The operation of this system diminishing the number of convicts to be maintained by society, of course in some measure diminishes its expenses: but the maintenance of criminals, whilst they are confined in prison, constitutes but a small portion of the actual, enormous, and unequal expenditure to which they subject society—their trial and conviction, the support of a numerous and vigilant police to prevent, detect, and punish offences, &c. are onerous but indispensable items. Criminals, when not in prison, are in fact supported at an increased cost by the public. The ravages of the incendiary, the fraud of the counterfeiter, the depredation of the burglar and robber, constitute an unequal, a grievous, and incalculable tax on those members of society, who in general are least able to endure the exaction. The habits of criminals tend to pauperism, always to idleness; they are consumers, not producers; their evil example occasions wide spread corruption, terror, and misery. What econmists can therefore calculate the real cost of crime? The expenditures in the Penitentiary compose but an insignificent comparative item: the partial view is indeed limited, which is confined by its walls. As "the Pennsylvania system of Prison Discipline" effects, not indeed the extirpation, but the prevention or diminution of crime, to an unknown and unrivalled extent—the dictates of mere economy, of sordid self-interest, as well as of patriotism, humanity, and religion, cry aloud for its general ado-

tion. The prime cost of an efficient labour saving machine is never considered by the intelligent and wealthy capitalist as a wasteful expenditure, but as a productive investment. This Penitentiary will be, strictly speaking, an apparatus for the expeditious, certain, and economical eradication of vice, and the production of reformation. The state of Pennsylvania has exhibited, at once, her wisdom, philanthropy, and munificence, by the erection of this immense and expensive structure, which, in connexion with her other noble institutions, will largely contribute to the amelioration and protection of her population. G. W. S.

—

The Corner Stone of the front building of the Penitentiary was laid on the 22d day of May, 1823, in the presence of the Commissioners, Architect, Superintendent, and workmen. On this interesting occasion, Mr. Roberts Vaux said, that he much regretted the unavoidable absence of the President of the Board, in whose place he had just then been unexpectedly desired to say a few words concerning the purpose for which the Commissioners were assembled.

He remarked, that the occasion was calculated to awaken reflections at once painful and gratifying. *Painful*, because such was the erring character of man, so ungovernable were his passions, & so numerous his propensities to evil, that it was necessary society should provide means for the punishment of offenders against its laws. *Gratifying*, because a correct view of human nature, coupled with the indispensable exercise of Christian benevolence, had led to the melioration of punishments.—*Justice* was now mixed with *Mercy*, and whilst the community designed to teach offenders that the way of the transgressor is hard, it wisely and compassionately sought to secure and reform the criminal by the most strict solitary confinement. The Penitentiary now to be erected, was designed to accomplish these important ends, and when it shall be completed, it will afford the first opportunity of putting into efficient practice the penal code of this State. Mr. Vaux congratulates his fellow citizens of Pennsylvania, because their legislators were the first (almost forty years ago) to abolish those cruel and vindictive penalties which are in use in the European countries from which we had descended.—The Pillory, the Whipping Post, and the Chain, were not calculated to prevent crime, but to familiarize the mind with cruelty; and consequently to harden the hearts of those who suffered, and those who witnessed such punishments. The substitution in Pennsylvania of milder correctives had excited the notice and respect of nations abroad, as well as of our sister States—our example had in some instances been followed, and he had no doubt the principle would more extensively prevail.

The box deposited in the corner stone, which you have seen laid, contains a plan and elevation of the prison, and a medal plate bearing the following inscription:—

PENITENTIARY
FOR
The Eastern district of the state of Pennsylvania:
FOUNDED
AGREEABLY TO AN ACT OF ASSEMBLY,
Passed on the 20th day of March, in the year of our Lord one thousand eight hundred and twenty-one.
JOSEPH HEISTER, *Governor.*
ANDREW GREGG, *Secretary of the Commonwealth.*
Under the direction of the following Gentlemen:
COMMISSIONERS.

Thomas Sparkes,	Daniel H. Miller,
John Bacon,	William Davidson,
Roberts Vaux,	James Thackara,
Samuel R. Wood,	Caleb Carmalt,
Coleman Sellers,	George N. Baker,

Thomas Bradford, Jr.

JOHN HAVILAND, *Architect.*
JACOB SOUDER, *Superintendent of Masonry.*

—

It only remains for us, said Mr. Vaux, in conclusion, to express our ardent desire, that this institution may fully answer the important purposes for which it was founded. *Am. Daily Adv.*

EASTERN STATE PENITENTIARY.

Communication from Charles S. Cox, Esq. accompanied with a report of the Board of Inspectors of the Eastern State Penitentiary.

READ, January 6, 1830.

Philadelphia, January 2, 1830.

Sir,—I have the honor to transmit to you, to be laid before the Honorable the House of Representatives of Pennsylvania, the first report of the board of inspectors of the eastern state penitentiary.

With sentiments of the highest respect,
I have the honor to be,
Sir, your most ob't. serv't.
CHAS. S. COXE.

To Frederick Smith, Esq.
Speaker of the House of Representatives of Penn.

To the Honorable Senate and House of Representatives of the Commonwealth of Pennsylvania.

The inspectors of the Eastern State Penitentiary, situated in the county of Philadelphia, appointed by the honorable the judges of the supreme court of Pennsylvania, assembled on the 19th day of May, 1829, and proceeded to organize the board, and appoint the officers. The following members at present fill the offices annexed to their names.

CHARLES SIDNEY COXE, *President.*
JOHN SWIFT, *Secretary.*
DANIEL H. MILLER, *Treasurer.*

On the 29th of June, Samuel R. Wood was appointed *Warden*; John Norvell, *Clerk;* and subsequently, Dr. Franklin Bache, *Physician.* On the 1st day of July, the penitentiary was surrendered by the board of commissioners for its erection, and this board took possession thereof, and has held it in readiness to receive such convicts as were liable to be committed thereto, subsequently to that time. From the last mentioned date to this time, a term of six months only nine prisoners, have been received, their age, sex, place of nativity, time of commitment, term of imprisonment, offence; whether for a first or repeated offence; the time of conviction, and the court in which the convictions occur, are particularly designated in the table annexed.

No prisoner has died, escaped, been pardoned, or discharged; nor has any sickness occurred, except in one instance, the nature of which will appear from the following extract from the physician's report for December, 1829.

"None of the prisoners have been sick, except John Starns, who has been laboring under a catarrhal affection, but not of such severity as to justify his removal to the infirmary. At present he is much better, and appears to be on the recovery. This prisoner was an invalid when he arrived, in consequence of a severe hernia."

The inspectors are required to attend to the religious instruction of the prisoners, and to procure a suitable person for that object, who shall be the religious instructor of the prisoners. His duties are declared to be, to attend on the moral and religious instruction of the convicts in such manner as to make their confinement, as far as possible, the means of their reformation, so that when restored to their liberty, they may prove honest, industrious, and useful members of society. The importance of this officer, to a fair trial of the system, was soon perceived by the board, and great anxiety has been felt, to comply with the views of the Legislature, explained by these requisitions of the statute. It is, how

ever, further provided, that the services of this officer shall be gratuituous. The ministers of the gospel, who might have leisure, or a disposition to accept the appointment, are generally unable to perform such services without a suitable provision for themselves, and their families. Had any candidate been presented to the board, under these circumstances, it is not probable a proper choice could have been made; but as no one has offered, the board have been unable to appoint any religious instructor; and the only instruction of that character afforded to the convicts, has been derived from the imperfect efforts of the other officers of the institution. In the opinion of this board, a fair experiment of the system of solitary confinement, with labour, cannot be made without moral and religious instruction, and a suitable individual to fill that office cannot be obtained, unless the Legislature allow a compensation for his services.

By the 12th section of the act of April 23, 1829, it is enacted, "that for the purpose of finishing the eastern penitentiary, introducing a supply of water from Fair Mount water works, and procuring the necessary furniture and fixtures for the accommodation and reception of prisoners, the sum of 5,000 dollars, be and is hereby appropriated for said purposes, and the commissioners appointed to superintend the erection of the state penitentiary, are directed to carry the same into effect."—This sum appears to have been inadequate to the purposes for which it was designed, as all the necessary furniture and fixtures have not been provided; and the water from Fair Mount, owing to that and other causes beyond the control of the commissioners, has not been introduced. By the 13th section of the same act, this board are authorized to "draw on the state treasury for any sums not exceeding 1,000 dollars; to support and employ the prisoners, until such sums of money may become payable by the several counties, from which convicts may be removed to the prison, shall be received by the board, as shall enable it to manage the affairs of the prison without such aid." The inspectors are prohibited by the 9th section, from drawing on the county treasurers before the first Monday in May, in each year, and then only for an annual account rendered three months before to the county commissioners for the previous support of the convicts. Although it is hoped, in many, if not most instances, that the counties may not be called on at all, yet in order to effect this favorable result, there is a necessity for a fund to furnish tools, materials, fuel, food, &c. in the first instance. The sum of 1,000, above mentioned, has been partly expended in providing furniture, &c. necessary to the convicts' health and accommodation, not supplied by the commissioners, and is insufficient for the purpose for which it was designed. The board, therefore, respectfully recommend that the further sum of 4,000 be appropriated by the Legislature to this object, and that the inspectors be authorized to draw on the treasury for that amount, in order that this great institution, on which the state has expended so large an amount, and so interesting to the cause of humanity, may not be crippled by the want of means to put it into operation.

The inspectors are required, in their annual return, to make such observations as to the efficiency of the system of solitary confinement, as may be the result of their experience, and to give such information as they may deem expedient for making the said institution effectual in the punishment and reformation of offenders.

The extraordinary fact, that but nine convicts have been sent from the counties composing the eastern district, containing so large a majority of this populous state, demands and deserves great consideration from all interested in our penal code; but the inspectors refrain from the expression of any sentiment resulting therefrom, as they cannot consider themselves justified in expressing a judgement, "the result of their experience," after so short a trial of the system. Indeed, although nothing seriously militating against the system has yet occurred within their observation, and much that is favourable has struck them, they would rather suffer a longer time to elapse, and await the operation of the institution upon a larger body of prisoners, before they should feel themselves authorized to express to the Legislature a decided judgment for or against the system of solitary confinement with labor.

With these remarks, extracts from the report of the warden are annexed, in order to afford the Legislature such information as the board possess.

All which is respectfully submitted by the board.

CHAS. S. COXE, President.

January 1, 1830. JNO. SWIFT, Secretary.

Of course none could have been previously convicted to this penitentiary; & the number of times stated above has been derived from the best sources. Of the 9 prisoners, 3 only had been brought up to any trade, and one of these could not be carried on here advantageously.

Prisoners' numbers. No.	Age.	Sex.	Place of nativity.	When sentenced.	Term of imprisonment.	Offence.	At what court sentenced.	Number of times convicted.	How employed.
1.	18	Male.	Harrisburg, Penna.	Oct. 22, 1829	2 years	Burglary	Oyer and Terminer, Del.	First offence.	Shoemaking.
2.	20	do	Chester Co. Penna.	Nov. 7, 1829.	1 do	Horse stealing	Quarter Sessions, Chester.	do do	do
3.	28	do	Fayetville, N.C.	21,	11 do	Highway robbery	Oyer and Terminer, Phila.	Third do	Tailoring.
4.	18	do	Philadelphia.	21,	8 do	Highway robbery	Oyer and Terminer, Phila.	Fourth do	Weaving.
5.	42	do	Franklin co. Penna.	11,	2 do	Horse stealing	Quarter Sessions, Cumberland.	Second do	Winding bobbins.
6.	22	do	City of New York.	17,	2 do	do	Oyer and Terminer, Lancaster.	First do	Shoemaking.
7.	18	do	Perry Co. Penna.	11,	1 do	do	Quarter Sessions, Franklin.	do	Carpenter.
8.	29	do	Guernsey Co. Ohio.	25,	2 do	do	Quarter Sessions, Adams Co.	do	Spooling.
9.	22	do	Ireland, Armaugh Co.	Dec. 28,	1 do	Passing counterfeit note.	Quarter Sessions, Philadelphia Co.	do	Weaving.

B.

Extracts from the Warden's report to the inspectors.

"As the furnaces for warming the cells on the original plan, have not yet been built, and the weather is too cool to do without fire, I purchased six small coal stoves, and had them fixed in the cells as soon after these pris-

oners arrived, as I possibly could. These stoves keep the prisoners warm; but I find this mode of heating the cells troublesome, expensive, and dirty; and as additional stoves will be required with the increase of prisoners. I thought it advisable to make arrangements for an air heater or furnace; that will be sufficient to warm twenty cells; this I hope to have in operation in ten days or two weeks.

"I rejoice that it has never been the policy of the legislature of this state to sacrifice the safety of the community and the welfare of the convict for apparent pecuniary gain; they have taken a higher, more dignified, and nobler ground; they have provided prisons, where the reformation and improvement of the criminal and protection of society, are grand objects; they have provided that labor shall be furnished the convict in his cell, and not for the sordid purpose of reimbursing to the commonwealth the expense of his maintenance. Nevertheless, sufficient time has elapsed to satisfy me of the correctness of an opinion I have long believed and asserted, 'that a prisoner who has two years or upwards to serve, can, in his solitary cell, earn sufficient to clear all his expenses, from the time of his admission to his discharge.' I am well aware that the time elapsed since we have been in operation is too short, to come forward with any other than general remarks. I have seen nothing to impair my confidence in the efficacy of the system; but in all its operations, so far, much to strengthen one in the conviction that it will effect the great objects which its most sanguine friends have ever anticipated. The prisoners have been hitherto obedient and exemplary in their deportment. They appear anxious to obtain employment, and when it has been furnished, they have performed their labor with cheerfulness and assiduity. Those who are learning shew an expertness and desire to learn beyond my expectation. Having nothing whatever to divert their attention from their occupation, and being able to work at least twelve hours per day during the whole year, (as there is no danger in furnishing them with lights) are circumstances very much in favor of working in separate confinement. I am therefore sanguine in the belief that if proper machinery, &c. were provided, that this penitentiary would not only produce the great good which we all so ardently desire to the unfortunate inmates, but would also relieve the several counties who send them of the great burthen they have hitherto borne in the support of the convicts.

"To employ the convicts thus advantageously, it, however, will be necessary to have a considerable sum for the purchase of tools, machinery, and stock. Without these we can certainly do little to advantage in a pecuniary point of view. The board of commissioners for the erection of this penitentiary having expended all their funds, and it is quite uncertain what amount they may obtain from the sale of vacant lots, I would respectfully suggest that an early application should be made by you to the legislature to furnish a sum adequate to enable you to purchase the necessary implements and stock, to employ all the prisoners advantageously, and thus prevent the counties being called upon to support their respective convicts.

"From the remote situation of the penitentiary from the city, it is highly important that it should be furnished with a larger alarm bell. This and a clock formed part of the original plan of the board of commissioners. I think these also should be obtained in addition to the articles previously mentioned.

"To effect the great object of Penitentiary dicipline, it is indispensable to prevent all intercourse among the prisoners. I feel, therefore, much pleasure in adding, that experience has convinced me that the structure and discipline of this penitentiary have completely accomplished this great desideratum. Conversation and acquaintance are physically impracticable to its inmates."

[Signed,] S. R. WOOD, *Warden.*

Eastern State Penitentiary, 12 mo. 5, 1829.

HOUSE OF REFUGE.

To the Senate and House of Representatives of the Commonwealth of Pennsylvania, the Managers of the House of Refuge respectfully REPORT:

That the Institution was opened on the 8th day of December, 1828; the walls and buildings being then sufficiently completed for immediate purposes. The first "Juvenile" delinquent was received on that day. So numerous appear to be the persons of this description, that 188 children have been admitted previously to the 29th of December, 1829. Of these 148 were boys, and 40 were girls. The actual number remaining in the house is 117; to which it has been reduced in the following manner, viz:

26 have been indentured, viz. 20 boys and 6 girls.
4 returned to the Almshouse.
1 sent to do.
9 returned to their parents and friends, viz. 8 boys and 1 girl.
9 discharged as being of age, viz. 6 boys and 3 girls.
7 discharged as improper subjects or irregularly committed, viz. 5 boys and 2 girls.
1 sent to the children's asylum.
1 returned to the New York House of Refuge, from which he had escaped.
12 escaped in consequence of the facilities afforded while the workmen were engaged in erecting the new walls.
1 died; a boy who was in ill health when committed.

71 There remain 89 boys and 28 girls.

It may account in some measure for the want of moral principle and good conduct among these children, that many of them have been for at least a considerable time, without the opportunity of receiving parental assistance and advice. One hundred and forty-eight of those received had lost one or both of their parents—eighty had no father living—forty-one had lost their mothers—and twenty-seven had been deprived by death of both their parents.

In tracing the records of admission to learn the probable opportunities which have been enjoyed for instruction, it appears that

113 are the children of mechanics and laboring men.
53 lost their fathers when too young to know their occupations.
10 are children of seamen.
3 do of merchants.
6 do of shopkeepers.
3 do of farmers.

The manual occupations of the boys in the House of Refuge, consist of tayloring, carpentering, book binding, basket making and wicker work.

The girls are employed in cooking, washing, and ironing for all the establishment, and in sewing and house work generally.

The work done and articles manufactured by the children during the last year, are as follows, viz—

By the boys, 84311 spelling books bound.
5200 do do folded.
612 pairs of shoes.
220 roundabout jackets.
357 pairs of pantaloons.
170 duck trowsers.
150 baskets of various sizes.
8615 demijohns covered with wicker work.
903 pint flasks do.

Many have also been employed in heading pins, and picking oakum.

By the girls, 220 shirts.
250 check and tow aprons.
161 pocket handkerchiefs.
81 frocks.
24 capes or vandykes.
75 pairs of shoes bound.

7 cloth caps for boys.
224 sheets.
16 bed spreads.
71 bed ticks.
81 pillow ticks.
172 pillow cases.
56 night caps.
21 pockets.
25 petticoats.
108 pairs stockings.
8 towels.
16 bonnets.
45 roundabout jackets for the boys.

Eight hours of each day are devoted to work, and four are passed in school, which is conducted on a system of mutual instruction.

Seventy-one of the children could neither read nor write when admitted, and most of the others were but imperfectly taught even in these particulars. Fifty-five have acquired a knowledge of reading and writing in the house.

A well selected Juvenile library has been generously presented to the Institution. The donors are for the most part booksellers of Philadelphia. It consists of 75 maps and about 1700 books. Every child that can read is encouraged and required to receive and keep in use a book belonging to the library. A desire of knowledge is thus excited—a habit and love of reading are promoted, and means of instruction are afforded which it is hoped will prove of lasting utility.

Satisfactory accounts have been received from all the children who have been bound out, except three.

Eleven boys who had nearly attained to full age were shipped (with their own consent) on board of vessels bound to the Pacific ocean, on long whaling voyages; a destination which is believed to be the most eligible for those who have been long permitted to indulge themselves in habits of idleness and dissipation.

As a practical proof of the value of the establishment, the Managers refer with pride to the sensible diminution in the number of youthful offenders arraigned at the bar of the criminal courts. This effect was obvious soon after the house was opened, and it has now continued too long, to permit a doubt of its cause. If the young are withdrawn from temptation, and no longer either exhibit or imitate evil examples, it may be hoped that the numbers of adult criminals will in like manner soon be lessened the reformation of those who have been heretofore growing up in a career of guilt.

Additional accommodations having become necessary for the increased number of boys, the Managers erected a range of work shops, 220 feet in length by 20 feet in depth, and two stories high. They also erected a building containing one hundred and ten dormitories, and a large kitchen: and enlarged the chapel and boy's dining room, and built a stable. These buildings are of stone and are substantially finished.

Ample room is now provided for one hundred and ninety-six boys and eighty-three girls. After the discipline and instruction of the house have been permitted to produce their due effect, it is believed that as many will be bound out, annually, as are admitted. The numbers will therefore in all probability not be at all too great for the accommodations now provided, which are calculated for 278 persons.

Considerable expenses have been incurred, by reason of these improvements; and also to defray the temporary loan of 6,500 dollars, and to aid in the maintenance of the Institution. Loans have therefore been obtained to the amount of 20,000 dollars. They are secured by mortgages on the ground and buildings. The debt due by the Institution now exceeds twenty-eight thousand dollars.

In conclusion, the Managers would state, that the experiment, which has thus far been made, has answered their most sanguine expectations. Numbers have been withdrawn from crime and ignorance, and have been instructed in the knowledge of virtue, and in the means of obtaining an honest livelihood. The Managers hope hereafter to be able to congratulate the Legislature on the reduced expense of prisons, and the diminished numbers of adult offenders, as they now do upon the improvement in morals, and absence from exposure to disgrace and punishment, of those of tender years.

By order of the Board of Managers of the House of Refuge.

JOHN SERGEANT,
President H. R.

Attested,
JAMES J. BARCLAY, Secretary H. R.

LOSS OF WEIGHT IN COINS.

To ascertain the greatest diminution of weight which our coins will undergo and yet leave their devices and inscriptions clearly discribable, experiments have been recently made at the mint; and it is found that our dollar and its parts when reduced by attrition, so that their devices and inscriptions are not wholly obliterated, but would be entirely effaced by a slight farther diminution, lose the proportions of their respective full weights which follow:

The dollar loses five and seventy six hundredths per cent.

The half dollar loses six and seventy-two hundredths per cent.

The quarter dollar loses seven and sixty-eight hun. dredths per cent.

The dime loses nine and one tenth per cent.

The half, dime loses ten and one fifth per cent.

When our silver coins are diminished in any degree greater than those respective rates, they are destitute of the impression of the mint; and for that reason alone, are unfit for further circulation.

From a careful examination of our own coins and those of other countries, the loss of weight sustained by our coins in ordinary use, during a period of fifty years, is estimated as follows:

The eagle loses about 1 per cent.
The half eagle loses nearly 2 per cent.
The quarter eagle loses about 3 per cent.
The dollar loses about 1 per cent.
The half dollar loses about 2 per cent.
The quarter dollar loses about 3½ per cent.
The dime loses about six per cent.
The half dime loses about 10 per cent.

It is proper that our coins shall not be a legal tender when they are diminished in weight, more than one twenty-fifth part, or 4 per cent. of their full weight; and that this rule shall be applied to all the coins.

Different rates of Diminution for the different coins would be too complex, and would afford very little advantage. Under the restriction now proposed our coins diminished only by ordinary use, will be legal money during the following periods:

The eagle, about 200 years.
The half eagle, about 100 years.
The quarter eagle, about 67 years.
The dollar about 200 years.
The half dollar, about 100 years.
The quarter dollar, about 57 years.
The dime, about 33 years.
The half dime, about 20 years.

The foreign coins which are now a legal tender is the Spanish dollar and its parts. The recent coinage of Spain is limited to the dollar, few of which reach this country. Our principal supply was from South America, which has now coins of its own. Probably one half of the Spanish coins now in use here were made before 1792, when our mint was established. It is estimated that those Spanish coins now in our circulation, are at this time, less in weight, than their original full weights, by the following proportions.

The dollar, about 1 per cent.
The half dollar, about 3 per cent.

The quarter dollar, about 6 per cent.
The eighth of a dollar, about 11 per cent.
The sixteenth of a dollar, about 19 per cent.

These are averages of the rates of diminution of these several coins; many of them of each denomination, being reduced more and many less than these estimated rates.

The aggregate diminution of the coin now in circulation is estimated at 7 per cent. Perhaps not a hundredth part is legal money, according to the standard prescribed for it by our laws.

The coins of all kinds now in the United States are estimated at 23 millions of dollars; of which 14 millions are our own coinage, and 5 millions Spanish. Whilst our early coins are fast disappearing, the Spanish continue in circulation; the former being converted into bullion, and the latter, of less value, are retained. An amount not less than 11 millions of dollars of our silver money has been withdrawn from circulation. It is indispensable to the preservation of our own coins that the Spanish should cease to be legalized. One of the advantages of their extirpation will be a uniform expression of value in the national money, to the extinction of pounds and their parts. The mint will soon be able to coin ten millions a year, or any greater sum our wants may require.

BILL OF MORTALITY IN PHILADELPHIA.

JANUARY, 1830.

Diseases.	*Adults.*	*Child'n.*	*Total.*
Abscess,	1	0	1
Apoplexy,	4	0	4
Asthma,	1	0	1
Atrophy,	0	1	1
Burns,	0	2	2
Bronchitis,	1	0	1
Caries,	1	1	2
Casualties,	1	0	1
Catarrh,	0	2	2
Consumption—lungs,	41	8	49
Convulsions,	0	22	22
Concussion of the Brain,	1	0	1
Debility,	8	13	21
Diarrhœa,	2	0	2
Disease of Heart,	1	0	1
Died from the cold,	3	0	3
Dropsy,	6	1	7
of Brain,	0	14	14
of Breast,	2	0	2
Drunkenness,	2	0	2
Dyspepsia,	2	0	2
Effects of salivation,	1	0	1
Epilepsy,	2	0	2
Erysipelas,	1	0	1
Fever,	3	2	5
Intermittent,	0	1	1
Puerperal,	1	0	1
Scarlet,	0	3	3
Typhus,	2	1	3
Found dead,	1	2	3
Gangrene,	1	0	1
Gout,	1	0	1
Hives,	0	8	8
Hooping Cough,	0	2	2
Hœmorrhage,	1	1	2
Inflammation—Lungs,	3	3	6
Brain,	4	4	8
Stomach,	3	0	3
Bowels,	3	1	4
Liver,	3	0	3
Breast,	0	1	1
Peritonœum,	0	1	1
Insanity,	0	1	1
Laudanum in excess,	1	0	1
Mania a potu,	5	0	5
Murdered,	0	1	1
Old Age,	3	0	3
Pleurisy,	2	0	2
Scrofula,	0	1	1
Small-pox,	7	15	22
Sore throat,	0	2	2
Still-Born,	0	27	27
Sudden,	4	1	5
Syphilis,	1	0	1
Suicide,	1	0	1
Ulcers,	1	0	1
Varioloid,	1	0	1
Unknown,	1	2	3
Violence,	0	1	1
Wounds,	1	0	1
Total,	135	145	280

AGES.		AGES.	
Under 1,	84	Between 40 and 50,	17
Between 1 and 2,	16	50 and 60,	23
2 and 5,	23	60 and 70,	12
5 and 10,	10	70 and 80,	7
10 and 15,	5	80 and 90,	6
15 and 20,	7	90 and 100,	2
20 and 30,	37		
30 and 40,	31		280

Weeks.	*Adults.*	*Child'n.*	*Total.*
From the 2d to 9th,	34	33	67
9th to 16th,	33	30	63
16th to 23d,	31	43	74
23d to 30th,	37	39	76
Total,	135	145	280

Whites, 236 | Blacks, 44 From Alms-house, 36.
Males, 159; Females, 121—of whom 77 boys, 68 girls.

The past month has presented an unusual degree of health in the City and Liberties; with the exception of the Small-pox, which still prevails in the districts, we have been visited by no epidemic. The majority of the diseases have been such as are produced by the sudden vicissitudes of temperature, so prevalent at this season. By deducting the casualties, violent and sudden deaths and the *still-born*, and the deaths from old age—the entire number of deaths from diseases, including 49 cases of consumption will be found to be only 235.

Statement of deaths in JANUARY from 1807 to 1830, both inclusive.

Years.	*Ad.*	*Ch.*	*To.*	*Years.*	*Ad.*	*Ch.*	*To.*
1807	92	58	150	1819	120	72	192
1808	91	45	136	1820	96	135	231
1809	73	57	130	1821	114	87	201
1810	82	67	149	1822	158	114	272
1811	79	69	148	1823	186	128	314
1812	114	89	203	1824	272	166	438
1813	77	52	129	1825	145	144	289
1814	49	49	98	1826	194	134	328
1815	88	43	131	1827	176	137	313
1816	99	82	181	1828	200	161	361
1817	98	59	157	1829	208	178	386
1818	163	72	235	1830	135	145	280

State of Thermometer at the Health Office, for January.

	9	12	3		9	12	3
1st,	34	39	39	10th,	41	45	46
2d,	39	45	46	11th,	20	26	26
3d,	38	48	47	12th,	27	32	34
4th,	46	45	44	13th,	31	36	40
5th,	35	37	36	14th,	34	36	38
6th,	30	36	38	15th,	36	38	40
7th,	36	44	45	16th,	44	48	49
8th,	39	43	42	17th,	39	44	43
9th,	30	33	34	18th,	25	29	29

	9	12	3		9	12	3
19th,	24	31	34	26th,	23	27	26
20th,	37	41	43	27th,	22	29	33
21st,	32	33	32	28th,	24	26	26
22d,	34	39	41	29th,	21	24	26
23d,	32	33	32	30th,	17	19	18
24th,	20	21	24	31st,	14	21	21
25th,	25	32	37				

RATES OF TOLL

Upon the Pennsylvania Canal.

As fixed by the Board of Canal Commissioners on the 18th December, 1829.

Per Ton per Mile.

	Cts.	Mills.
On flour and fish, salted beef and pork, butter and cheese, beer and cider, per ton per mile	2	0
On all agricultural productions, not particularly specified	2	0
On carts, wagons, sleighs, ploughs, and agricultural nstruments, & mechanics' tools necessary for the owners' individual use, when accompanied by the owners emigrating	1	5
On household furniture	2	0
On Gypsum	2	0
On salt	2	0
On iron ore	1	0
On pig iron and broken castings	1	5
On castings, blooms, and anchonies	2	5
On bar, rolled and slit iron	3	0
On sand, clay, earth, gravel, bleached ashes, and manure	0	7½
On brick, lime and stone, unwrought or rough hewn	1	0
On slate and tile, for roofing	2	0
On marble in blocks, unwrought or rough hewn	2	0
On marble wrought and polished	3	0
On pot and pearl ashes, and charcoal	1	5
On hemp and tobacco going eastward	1	5
On cotton	1	5
On deer, buffaloe and moose skins	2	5
On furs and peltry (except deer, buffaloe and moose skins)	4	0
On mineral coal	1	0
On wood for fuel, per cord per mile, if in boats	2	5
The same if in rafts	4	0
On tan bark per cord per mile if in boats	2	5
The same, if in rafts	4	0
On timber, square and round, if carried in boats or scows down stream, per 100 cubic feet per mile	1	2½
The same if carried in boats or scows up stream	2	5
The same if carried in rafts	3	0
On boards, planks and scantling, reduced to inch measure, and all sideing lath and other sawed stuff less than one inch thick per 1000 feet per mile if conveyed in boats or scows down stream	1	5
The same if conveyed in boats or scows up stream	2	5
The same if conveyed in rafts	4	0
On shingles, if short, and conveyed in boats or scows down stream per 1000 per mile	0	5
The same if long and conveyed down stream	0	7½
The same if short and conveyed in boats up stream	1	0
The same if long and conveyed up stream	1	2½
The same if short and carried in rafts	1	5
The same if long and carried in rafts	2	0
On split posts or rails for fencing if carried in boats or scows down stream per 100 per mile	2	0
The same if carried in boats or scows up stream	4	0
The same if carried in rafts	5	0
On staves and heading if carried in boats or scows down stream per ton per mile	0	7½
The same if carried in boats up stream	1	5
The same if transported in rafts	2	0
On hoop poles and split lath per ton per mile	1	0
On liquors, groceries and queens ware per ton per mile	3	0
On all articles not enumerated, passing north or west, per ton per mile	4	0
On all articles not enumerated, passing southward and eastward, per ton per mile	2	0
Explanateon.—Cattle, horses, and all other live stock, the raw hides of domestic animals, are to be considered within the term "agricultural productions" and each horse is to be estimated at 6 cwt.		
On boats made and used chiefly for the transportation of property per mile	3	0
On boats used chiefly for the transportation of persons, 25 cents per mile, or ten cents per mile on the boat, and one cent per mile on each passenger over eight years of age at the election of the proprietors; *Provided*, They render such satisfactory accounts of the number of passengers, as may be required, and make such election when their boats commence business for the season.		
On each passenger transported in freight boats, & over 12 years of age per mile	0	5
For passing the out let lock at Middletown.		
On every loaded ark	$1	00
Do. empty ark		50
Do. loaded boat		75
Do. empty boat		50
Lumber of all kinds in rafts or platforms, at the rate per thousand feet board measure		08

MISCELLANEOUS.

There are 769 students now attached to the University of Pennsylvania: of whom 394 are in the Medical Department (exclusive of 20 graduates who continue to attend the lectures,) 97 in the collegiate, 120 in the grammar, and 158 in the charity schools.—*Morn. Journ.*

The following are the nett balances of the fees received by the officers named in 1829, deducting expenses:

Inspector of ground oak bark,	$4,650
Two inspectors of domestic distilled spirits,	2,461
Inspector of salted provisions,	594
Inspector of butter and lard,	588
Inspector of Flour,	1,993

The navigation of the Delaware has continued interrupted all the week—sleds have been passing upon the ice. On Sunday afternoon, (7th inst.) a snow storm commenced, which continued during the night—on Monday morning there were about 5 or 6 inches in depth of snow upon the ground—and the sleighing continued pretty good until Thursday, (the 11th,) when a thaw commenced, which destroyed it.

DAUPHIN COUNTY.

Rates and Levies for 1829.

Harrisburg,	$3,538	55
Upper Paxton,	639	69
Middle Paxton,	732	11
Lower Paxton,	1,272	70
Mifflin,	631	90
Lykens,	733	84
Halifax,	925	60
Susquehanna,	1,787	56
Derry,	2,761	98
Hanover,	1,908	39
Swatara, upper district,	1,495	32
Swatara, lower district,	1,606	92
Londonderry,	1,935	03
Total,	$19,999	15

Pauperism in Dauphin County.

The amount of receipts including balance on hand on 7th January, 1829,			$7,983 77
Expenditures during the year,	-		7,842 77
Support of out door paupers		413 77	
Medicine for do		279 18	
Funeral expenses do		115 35	

289 paupers admitted into the house during the year 1829.
322 paupers, of which some eloped and some dismissed in same year.
50 paupers died in the house during the same year.
133 paupers at present in the house.
38 out-door paupers admitted during same year.
24 out door paupers died in same year.
55 out door paupers discontinued same year.
11 out door paupers at this time.
14 children bound out to trades.
1 child born in the house same year.

Statement respecting the public school established by the commissioners of Dauphin county, in pursuance of an act assembly entitled "An act authorising the commissioners of Dauphin county, to establish a public school in the borough of Harrisburg, on the Lancasterian system."

In the year ending January 5, 1829; the whole number of children taught in the said shool was two hundred and seventy eight.

The number of children taught in the said school, during the same year, whose parents, guardians or friends, have defrayed or agreed to defray any part or the whole of the expenses of their tuition, was ninety four.

The amount received during the same year, for the tuition of children whose parents, guardians, or friends have agreed to defray the whole or any part of the expense of their tuition is forty six dollars and thirty seven cents.

The amount due for the tuition of children during the same year, whose parents, guardians or friends have agreed to pay the whole or any part thereof, is one hundred and seventy seven dollars and thirty six cents.

The whole amount due in three years for the tuition of children whose parents, guardians or friends have agreed to defray the whole or any part of the expenses thereof, is six hundred and fifty six dollars and ninety three cents.

It appears by the county accounts that

$728 11, were paid for the tuition of poor children.
1767 20, for building for Lancasterian School,
46 89, for articles, for ditto,
281 43, for stationary for ditto,
46 25, for coal,
800 for teacher.

New Article for a Philadelphia Parlour.

The great abundance and excellence of the Schuylkill water now distributed through thirty-six miles of iron pipe in this city and liberties, has given rise to a new article of parlour furniture. A gentleman has lately erected in his dining room a very handsome classical Japaned urn, through the top of which rises a neat silver pipe, somewhat resembling the mineral water fountains, connected in the usual manner with the hydrant mains. To make the water of an agreeable temperature for summer, the pipe is carried to the bottom of a cold well, where it is coiled in such a manner as to expose a considerable surface to the action of the well water; thus by allowing the parlour fount to run a few minutes, the water is forced from the bottom of the well, having the temperature almost of an ice house in the warmest weather. The whole is so arranged as to be extremely ornamental, the waste water being carried off through the floor to the yard. It will no doubt be imitated by others. The plan of having a perpetual warm bath is becoming quite common. It is arranged by simply having a copper reservoir set into the throat of a wide kitchen chimney where it is kept always full by the common apparatus of a pipe and ball, and lever.—The ball on the end of the lever floats on the surface, and when any water is drawn off, the ball falling raises the other end, which fitting into the leaden conductor, admits more water till the reservoir is again filled; from the latter the heated fluid is conveyed to the kitchen, as well as to the bath house, in the first, of which it answers for all the uses of washing, scrubbing, &c. and in the latter affords the never failing luxury of a warm bath. Every house where the Schuylkill water is introduced, should possess this really economical apparatus. —*Saturday Bulletin.*

Account of Wheat and Rye Flour and Corn Meal inspected at Philadelphia for 1829:

Wheat Flour, 297,206 bbls.
Rye Flour, 39 523 bbls.
Corn Meal, 7,710 hhds,
Do. do, 18,888 bbls.

NOTICE.—The Inspector, of Flour in office, until 16th March last, has made no official return, and that made by his successor was in such a form that an account of the different kinds and qualities of Flour cannot be had from it, nor can we give the quarterly inspections, but the above is sufficiently correct for mercantile purposes. —*Price Current.*

The average quantity of flour inspected for the last five years, is 539,861 1.5, of which 50,000 barrels per year come down the Susquehanna from Pennsylvania and New York. Very little of the flour received here is inspected before it arrives. At New York a large part is inspected before it arrives.—*Baltimore Paper.*

A *Panther*, seven feet eight inches long, was shot at West Bethlehem, Pa. recently, after a chase of a mile by several citizens. It is said there is another in the vicinity.

Extract of a letter, dated READING, Feb. 1.

"A terrible occurrence happened near Pottsville a few days ago. A *Panther*, rendered frantic by the snow and cold, sprang upon a woman while passing alone in the road, and killed her.

"There is abundance of sleighing all about this neighborhood."

The following schedule, from the London Register of Arts, illustrates the advantages which Rail-Roads possess over canals. The power applied is in both cases supposed to be the same.

Velocity of Motion in Miles per hour.	On a Canal.	On a level Railway.	On a level turnpike road.
21.8	55,5000	14,400	1,800
3	38,542	14,400	1,800
31.8	28,316	14,400	1,800
4	21,680	14,400	1,800
5	13,875	14,400	1,800
6	9,635	14,400	1,800
7	7,050	14,400	1,800
8	5,420	14,400	1,800
9	4,282	14,400	1,800
10	3,463	14,400	1,800
13.5	1,900	14,400	1,800

☞The historical notes, from our friend in the interior, are received, and shall appear next week.

The request from Pittsburg shall be early attended to.

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